

Appl. No. : 10/081,003
Filed : February 20, 2002

REMARKS

In response to the Office Action mailed May 21, 2003, Applicant has amended the application as above. No new matter is added by the amendments as discussed below. Applicant respectfully requests the entry of the amendments and reconsideration of the application in view of the amendments and the remarks set forth below.

Discussion of Claim Amendments

Claim 5 has been added. Upon the entry of the amendments, Claims 1-5 are pending in this application. New Claim 5 is supported by, for example, original Claim 4, and thus does not introduce any new matter to the application. Applicant respectfully requests the entry of the amendments.

Discussion of Claim Rejections Under 35 U.S.C. § 103(a)

The Examiner has rejected Claims 1-4 under 35 U.S.C. § 103 (a) as being unpatentable over EP 0 579 434 A1. However, Claims 1-4 are patentable over the cited reference as discussed below.

Standard of *Prima facie* Obviousness

In order to provide a *prima facie* showing of obviousness under 35 U.S.C. § 103, all the claim limitations must be taught or suggested by the prior art. *See, e.g., In re Royka*, 490 F. 2d 981, 180 U.S.P.Q. 580 (CCPA 1974); MPEP 2143.03.

Patentability of Independent Claim 1

Claim 1 recites, among other things, an insulated electric power cable having an insulator layer formed by extrusion-coating and cross-linking a cross-linkable resin composition, which comprises a polyolefin blended with a total of 0.05 to 0.4 parts by mass of at least one compound selected from the group recited in the claim, based on 100 parts by mass of the polyolefin, and a prescribed amount of an organic peroxide cross-linking agent.

In contrast, EP '434 does not describe a cross-linkable resin composition which includes a polyolefin blended with a peroxide cross-linking agent plus at least one compound, wherein the

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amount of the additional compound is about 0.05 to 0.4 parts by mass based on 100 parts by mass of the polyolefin.

The EP reference shows three polyolefin compositions including a peroxide cross-linking agent and an additional non-peroxide cross-linking agent. These are Examples 21, 22 and 23 in this patent. Example 23 includes 100 parts by mass of polyolefin, 0.4 parts by mass of an anti-aging agent, 1.8 parts by mass of a peroxide cross-linking agent and 0.6 parts by mass of an auxiliary cross-linking agent. Examples 21 and 22 also contain 0.6 parts by mass of an auxiliary cross-linking agent.

Tables 1-3 in the present specification provide examples and comparative examples of various resin compositions, and Tables 4-6 show results of tests for the direct-current breakdown property, imp-breakdown property, degree of cross-linking and the extrusion property for the examples in Tables 1-3. Example 23 of EP '434 is similar to Comparative Example 1 in Table 1 of the present specification.

Comparative Example 1 includes 100 parts by mass of polyolefin, 0.5 parts by mass of an anti-aging agent, 1.8 parts by mass of a peroxide cross-linking agent and 0.5 parts by mass of an auxiliary cross-linking agent (Table 1). The table below compares the quantity of components measured in parts by mass based on 100 parts by mass of polyolefin for: the present invention, Comparative Examples 1 and 3, and Examples 21, 22 and 23 from EP '434.

	Invention	Comparative Examples 1, 3 from current specification and outside scope of invention	Examples 21 - 23 from EP Prior Art Patent
Peroxide Agent	variable	1.8	1.8-2.9
Auxiliary Agent	0.2-0.4	0.5	0.6
Anti-oxidant	variable	0.5	0-0.4

From the table above, it is clear that Comparative Examples 1 and 3 from the application demonstrate a resin wherein the auxiliary component is outside the range of the present invention, and Examples 21-23 from EP '434 demonstrate a resin wherein the auxiliary component is even further outside the range of the present invention. If the amount of the auxiliary compound blended with the resin is too high as in the comparative examples and prior

art document, the resulting composition exhibits excessive cross-linking. In addition, unless the additional compounds (such as the recited N,N'-m-phenylenebismaleimide) in the specific amount (e.g., 0.05 to 0.4 part by mass) are provided, the objects of the present invention are difficult or impossible to attain.

As shown in Table 4 in the present specification, the resulting values for Comparative Example 1 are a low direct current breakdown, a very low imp-breakdown electric field, a slightly higher degree of cross-linking, and a substantial rise in resin pressure at the time of extrusion. Accordingly, a resin composition including the components as recited in Example 23 would result in a composition having similar deficiencies. Also, since the auxiliary cross-linking agent is provided in even greater quantities in Example 23 of the prior art, compared to Comparative Example 1, the resin composition produced in Example 23 is likely to have even greater deficiencies.

EP '434 discloses a specific dialkyl peroxide (see lines 43 and 44 on page 3 of the specification, and line 1 of Claim 1). In particular, the EP reference is directed to usefulness of a high-temperature division-type cross-linking agent (pages 3-7, page 3 line 4 and lines 26-33). Furthermore, the EP reference discloses a composition produced by using the high-temperature division-type cross-linking agent (Example 11, page 10). However, in the present invention, a cross-linking agent may be any organic peroxide and need not be a specific dialkyl peroxide.

Claim 4 additionally recites that the cable is a *direct-current* electric power cable. According to one embodiment of the claimed invention, the insulated electric power cable is developed so as to be used for a high voltage direct-current power-transmission cable. This is because the cross-linkable resin composition that forms the insulator layer does not deteriorate impulse-breakdown property, and it is excellent in both a direct-current breakdown property and an extrusion property at the time of extrusion of the insulator layer (see lines 7-14 on page 10 of the specification).

However, EP '434 fails to teach or suggest either the direct-current electric power cable or the direct-current breakdown strength. Referring to Examples 20 to 22 on page 10, the EP reference describes compositions each produced by using a cross-linking agent and an additive such as a scorching inhibitor, to increase in the cross-linking degree. This additive has no effect for improving a DC property. In particular, EP '434 discloses AC breakdown strength (see

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Example 25, line 34 on page 12), but says nothing about improvement on DC breakdown strength.

In view of the above, the EP reference does not teach or suggest the recited features of Claim 1. Absent such teaching or suggestion, no *prima facie* case has been established. Therefore, Claim 1 is allowable over the prior art of record.

Discussion of Patentability of Dependent Claims

Claims 2-4 depend from base Claim 1, and further define additional technical features of the present invention. In view of the patentability of their base claim, and in further view of their additional technical features, the dependent claims are patentable over the cited reference.

Discussion of Patentability of New Claim 5

New Claim 5 includes all of the limitations of Claim 1, and additionally recites an insulated electric power cable *carrying direct current*. This limitation is discussed above with respect to Claim 4. In view of patentability of Claim 1 and in further view of this additional technical feature, new Claim 5 is patentable over the prior art of record.

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CONCLUSION

The applicant has endeavored to address all of the Examiner's concerns as expressed in the outstanding Office Action. Accordingly, amendments to the claims pursuant to statutory section 103, the reasons therefor, and arguments in support of the patentability of the pending claim set are presented above. In light of these amendments and remarks, reconsideration and withdrawal of the outstanding rejections is respectfully requested.

Any claim amendments which are not specifically discussed in the above remarks are not made for patentability purposes, do not narrow the claims, and it is believed that the claims would satisfy the statutory requirements for patentability without the entry of such amendments. Rather, these amendments have only been made to increase claim readability, to improve grammar, and to reduce the time and effort required of those in the art to clearly understand the scope of the claim language. Furthermore, any new claims presented above are of course intended to avoid the prior art, but are not intended as replacements or substitutes of any cancelled claims. They are simply additional specific statements of inventive concepts described in the application as originally filed.


If the Examiner has any questions which may be answered by telephone, he is invited to call the undersigned directly.

Respectfully submitted,

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